

## 2FXS/DPO PM FOREIGN EXCHANGE STATION/DIAL PULSE ORIGINATE DATAPORT WITH PERFORMANCE MONITORING INSTALLATION AND MAINTENANCE

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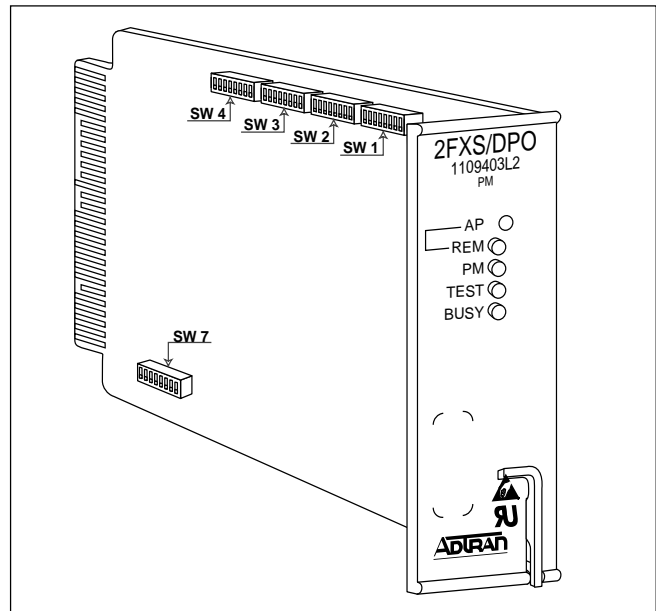


Figure 1. 2FXS/DPO

### 1. GENERAL

This practice provides installation and maintenance information for the ADTRAN® Intelligent 2-Wire Foreign Exchange Station/Dial Pulse Originate (2FXS/DPO PM) Dataport with Performance Monitoring, part number 1109403L2. It is a D4 compatible channel unit and operates in any standard D4 channel bank. Intelligent features requires the unit to be used in the ADTRAN ACT 2300, ACT 1900, or standard WECO® D4 channel bank using the ADTRAN LIU-3/PM common unit. The 2FXS/DPO PM provides an interface between a D4 channel bank Pulse Code Modulation (PCM) backplane interface and a 2-wire voice frequency (VF) transmission and signaling facility. **Figure 1** is an illustration of the 2FXS/DPO PM. The unit is multifunctional and can be provisioned to operate in the following modes:

- 2-Wire Foreign Exchange Station (2FXS)
- Dial Pulse Originate (DPO)
- Tandem FXS Mode
- Private Line Auto Ringdown (PLAR)

Using the FXS/DPO PM in an intelligent channel bank provides additional features and functions such as:

- Local and Remote Provisioning using either the craft interface or ADTRAN Site Manager through a menu driven program called EASYMENU™
- Performance monitoring of the loop
- Network and customer side monitoring and analysis
- Enhanced Test Capabilities

#### Revision History

Revisions to this practice include CLEI code and dip switch settings.

#### Features

- Backplane interface to the Pulse Code Modulation (PCM) bus.
- On board coder/decoder (CODEC) uses  $\mu$ -law encoding/decoding.
- Nominal 600 ohm or 900 ohm 2-Wire VF interface with DC isolation.

- Tandem or private line automatic ringdown mode with D3 or D4 signaling.
- Transmit and receive gain/attenuation adjustable in 0.1 dB increments.
- Transmit input range of -4.5 to 1.8 dBm.
- Receive output range of -6.3 to 0.0 dBm.
- Complies with AT&T Publications 43801, 41008, 41009, and Bellcore GR-1089-CORE requirements for Type 1 Equipment.
- Supports Calling Number Delivery and other common (CLASS™) service offerings according to TR TSY 000030 section 3.3.1.1.

## 2. INSTALLATION

After unpacking the unit, immediately inspect it for possible shipping damage. If damage is discovered, file a claim immediately with the carrier and then contact ADTRAN customer service (see *section 6, Warranty and Customer Service*).

The 2FXS/DPO PM plugs directly into an ADTRAN ACT 2300/1900 or standard D4 channel bank. No installation wiring is required. To install, grasp the 2FXS/DPO PM by the faceplate and insert it into the backplane connector until firmly seated.

### Provisioning Options

Most options on the 2FXS/DPO are provisionable either manually, using internal slide switches, or electronically using a menu-driven program called EASYMENU. The trunk processing options are found on internal slide Switch 7 (SW7) and can only be provisioned manually.

**NOTE** *Manual provisioning should be completed before the 2FXS/DPO is inserted into the channel bank. Electronic provisioning should be completed following installation.*

### Manual Provisioning

Internal slide switches SW1,2, 3, 4, and SW7 are used to manually provision and set the operational modes and options of the unit. **Figure 1** displays switch locations.

Slide switches SW1 and SW2 are used to set, receive, and transmit attenuation. **Table A** displays the available options.

Slide switches SW3-1, 2, 3, 4, and SW3-5 are used to provision the desired operation mode of the unit.

Slide switch SW4 is used to provision the trunk processing (SD), dial pulse correction (DPC), loop or ground start (GS), PLAR mode (PD3), tandem battery mode (TRB), tandem start mode (TWS), dial tone (DTG), and ringback tone (RTG).

Slide switch SW7 is used to provision the trunk processing options: make busy lead (1G), make busy closure (L), and busy trunk sleeve (S). **Table B** summarizes the option settings for SW3, SW4, and SW7.

**Table A. SW1 (Receive) and SW2 (Transmit) Attenuation Options.**

Function	Selection/Setting	
Add Attenuation	Amount in dB	Activate Switch to "On" Position
	0.1 dB	SW1,2 - 6
	0.2 dB	SW1,2 - 5
	0.4 dB	SW1,2 - 4
	0.8 dB	SW1,2 - 3
	1.6 dB	SW1,2 - 2
	3.2 dB	SW1,2 - 1
Note 1: Factory default setting for all switches is "off." Note 2: Multiple switch activation causes a cumulative effect on the amount of attenuation added. Note 3: The largest transmit attenuation value in 2-Wire mode is 6.3 dB.		

**Table B. SW3, SW4, and SW5 Option Settings**

Function	Switch	Selection	Setting
Operational Mode			
Impedance	SW3-1 (Z900)	900 ohms	ON
		600 ohms	OFF
TNDM Mode	SW3-2 (TNDM)	Enabled	On
		Disabled	Off
PLAR Mode	SW3-3 (PLAR)	Enabled	On
		Disabled	Off
FXS Mode	SW3-4 (FXS)	Enabled	On
		Disabled	Off
DPO Mode	SW3-5 (DPO)	Enabled	On
		Disabled	Off
General Parameters			
Ringback Tone	SW4-1 (RTG)	Enabled	On
		Disabled	Off
Dial Tone	SW4-2 (DTG)	Enabled	On
		Disabled	Off
Tandem Mode Signaling	SW4-3 (TWS)	Wink	On
		Immediate	Off
Tandem Mode Battery	SW4-4 (TRB)	Reverse	On
		Normal	Off
PLAR Mode Trunk Type	SW4-5 (PD3)	D3	On
		D4	Off
Start Mode	SW4-6 (GS)	Group	On
		Loop	Off
Dial Pulse Correction	SW4-7 (DPC)	Enabled	On
		Disabled	Off
Busy Trunk During CFA	SW4-8 (SD)	Enabled	On
		Disabled	Off
Trunk Processing			
Make Busy Lead 1 Ground	SW7-2 (1G)	Enabled	On
		Disabled	Off
Make Busy Closure	SW7-3 (L)	Enabled	On
		Disabled	Off
Busy Trunk Sleeve Option during CFA	SW7-4 (S)	Enabled	On
		Disabled	Off



The trunk processing options are provisioned only by switch SW7. Electronic provisioning is not available.

**Table C** provides a guide to ensure proper provisioning of the desired channel unit mode.

**Table C. Manual Configuration Guide**

Options	FXS Loop Start	FXS Gnd Start	TANDEM Loop Start	TANDEM Gnd Start	PLAR	DPO
RTG (SW4-1)	X	X	On/Off	On/Off	On	X
DTG (SW4-2)	X	X	On/Off	On/Off	X	X
TWS (SW4-3)	X	X	On/Off	On/Off	X	X
TRB (SW4-4)	X	X	On/Off	On/Off	X	X
PD3 (SW4-5)	X	X	X	X	On/Off	X
GS (SW4-6)	Off	On	Off	On	X	X
DPC (SW4-7)	On/Off	On/Off	X	X	X	X
SD (SW4-8)	On/Off	On/Off	On/Off	On/Off	On/Off	On/Off
TNDM (SW3-2)	Off	Off	On	On	Off	Off
PLAR (SW3-3)	Off	Off	Off	Off	On	Off
FXS (SW3-4)	On	On	Off	Off	Off	Off
DPO (SW3-5)	Off	Off	Off	Off	Off	On

Note: X = Switch position is ignored.

### Electronic Provisioning

ADTRAN EASYMENU is used to electronically provision the unit. Connect a VT 100 terminal or a computer running a terminal emulation program to the faceplate ADMIN port or REMOTE port using a standard male-to-male RS-232 cable. The settings for the ADMIN and REMOTE ports are shown in **Table D**.



A null modem cable is required to connect the REMOTE port directly to a terminal.

**Table D. Electronic Provisioning Settings**

	ADMIN Port	REMOTE Port
Settings	9600 baud	SW2 baud
	No Parity	No Parity
	8 bits	8 bits
	1 stop bit	1 stop bit

Once connected, enter the password. The factory default password is PASSWORD in all capital letters. The password may be changed by selecting:

- Common Module Menus (2)
- BCU (1)
- Configuration (1)
- Read/Write Password (9)

Before provisioning the unit electronically, access the channel unit by selecting:

- Channel Unit Menus (3)
- Desired slot (1-24)
- Provisioning (2)
- Select current operational mode (1-4)
- Select desired provisioning option (1-\*)

For additional information on EASYMENU operation or the ADTRAN Site Manager, refer to the EASYMENU User Manual, document number 61150.055L1-1 (found in the ACT 2300/1900 System Manual, document number 2150.050-3), or the Site Manager User Manual, document number 64150.075L1-1. For additional information about the LIU-3/PM see the LIU-3/PM User Manual, part number 61151.001L2-1.

### Initial Turn-up

Refer to the desired operational mode in **Table C** for the correct provisioning options.

### Transmit Attenuation

Determine the input TLP. Then use the following formula to calculate the amount of transmit attenuation to add to the circuit:

$$\text{Tx Attenuation} = \text{Input TLP} + \text{Internal Tx TLP of 4.5 dBm}$$

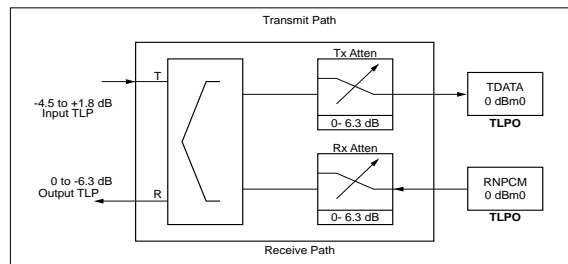
For example, if an input TLP level of -3 dB is to produce a level of 0dBm0 at TLP0, then the Transmit Attenuation should be set to 1.5 dB.

### Receive Attenuation

Determine the output TLP. Then use the following formula to calculate the amount of receive attenuation to add to the circuit:

$$\text{Rx Attenuation} = \text{Internal Rx TLP of 0 dBm} - \text{Output TLP}$$

For example, if 0dBm0 at TLP0 is required to produce an Output TLP level of -3 dB, then the Receive Attenuation should be set to 3 dB. **Figure 2** provides an illustration of attenuation settings.



**Figure 2. Circuit Path**

### 3. CONNECTIONS

The 2FXS/DPO PM occupies one card position in the D4 channel bank. The connector pin assignments are detailed in **Figure 3**.

### 4. TESTING

The 2FXS/DPO performs a self test after power on. During this time all four indicators turn *On* in a predefined sequence while the 2FXS/DPO verifies proper operation of critical circuits in the design. After successful completion of the self test, all indicators function in their normal mode.

#### Digital Loopback Test

The Digital Loopback Test is used to test loopback data coming from the network. Received data, or RNPCM, is latched in during the appropriate receive time slot. This data is then placed on the TDATA bus during the unit's transmit time slot.

#### Network On-hook/Off-hook Test

The Network On-hook/Off-hook test is used to test signaling sent to the network by the unit. When On-hook Test is selected, On-hook signaling is sent to the network. When Off-hook Test is selected, Off-hook signaling is sent to the Network. The customer loop is forced On-hook while this test is active.

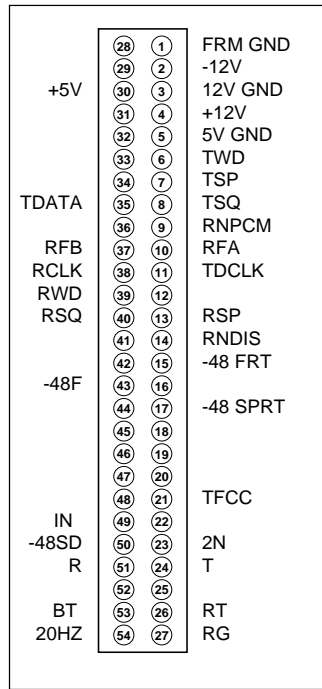
#### Customer Ringing Test

The Customer Ringing Test will activate the unit's ring relay in a 2-on/4-off ring cadence, providing ringing to the customer loop when a ring generator is properly connected to the channel bank.

#### 1004 Hz DRS Tone Generation Test

The 1004 Hz DRS (Digital Reference Signal) Tone Generation test is used to send the DRS signal to the network, loop, or both. When Network is selected, the DRS is sent to the network from the unit. The far end unit should measure a 1004 Hz tone at a level determined by the circuit gain of the far end unit. When Loop is selected, the DRS is placed on the receive path. The loop receive level is determined by the following equation:

$$\text{Receive Level} = 0\text{dB} - \text{Attenuation}$$



**Figure 3. Connector Pin Assignments**

When the option BOTH is selected, tone is placed on both the loop and the network.

### Accessing Tests Through EASYMENU

Once the unit is in normal operation, these test features are accessed by selecting:

- Channel Unit Menus (3)
- Desired slot (1-24)
- Test (4)

**NOTE** These tests are service affecting.

### Faceplate Indicators

The 2FXS/DPO faceplate indicators and descriptions are explained in **Table F**.

**Table E. 2FXS/DPO Faceplate Indicators**

Indicator	Indication	Description
REM	Off Green Flashing	Unit is manually provisioned. Unit is remotely provisioned. Configuration/provisioning error.
PM	Off Green	PM mode is not operating. PM mode is operating.
TEST	Off Yellow	All tests are inactive. Test is active.
BUSY	Off Green	Network and Loop On-hook. Network, Loop, or both are Off-hook.
Switch	Selection	Description
AP	Depressed	Alternate provisioning switch. Changes provisioning source from manual to remote or remote to manual.

The 2FXS/DPO PM has four faceplate indicators and a depressed provisioning switch. The front panel PM (Performance Monitoring) indicator *Flashes* during control link establishment and remains *ON* after the channel unit has been remotely provisioned.

If the channel unit has been remotely provisioned, the operator can alternate between the remote configuration data stored in nonvolatile memory or manual switch settings by pressing the momentary AP (Alternate Provisioning) switch located on the front panel.

The REM indicator remains *ON* when the channel unit is operating based on Remote Provisioning, and is *OFF* when based on manual switches. If the channel unit has never been remotely provisioned, the AP switch has no effect and the REM indicator remains *OFF*. The REM LED *Flashes* when an invalid operation mode is selected.

**5. MAINTENANCE**

The ADTRAN 2FXS/DPO requires no routine maintenance to operate properly.

ADTRAN recommends that repairs on the unit not be performed in the field. Repair services may be obtained by returning damaged units to ADTRAN (see section 6, *Warranty and Customer Service*).

**6. WARRANTY AND CUSTOMER SERVICE**

ADTRAN will replace or repair this product within ten years from the date of shipment if it does not meet its published specifications or fails while in service (see ADTRAN Equipment Warranty, Repair, and Return Policy and Procedure).

Return Material Authorization (RMA) is required prior to returning equipment to ADTRAN.

For service, RMA requests, or further information, contact one of the following numbers:

**ADTRAN Technical Support .....(800) 726-8663**

Standard support hours,  
Monday-Friday, 7am-7pm CST

Emergency Support:.,  
7 days/week, 24 hours/day

**ADTRAN Sales .....(800) 827-0807**

**ADTRAN Repair/RMA .....(205) 963-8722**

**Repair and Return Address**

ADTRAN, Inc.  
Customer Service Department  
901 Explorer Boulevard  
Huntsville, Alabama 35806-2807